

BMP1 Wetting

- A) All RACS and soils containing RACS, on the surface and in the sub-surface, ~~must~~shall be adequately wet (as defined in Section 1.2 of the Solid Waste Regulations) prior to and during RACS disturbance, except as provided in BMP 4(B)(2). Pre-wetting is not necessary if soils are already adequately wet. Water or amended water (as below) shall be applied at low pressure in order to prevent dust generation ~~or~~and splattering.
- B) Continuous misting of RACS and soils containing RACS shall be conducted during placement using equipment mounted spray bars, or additional hose operator(s).
- C) For RACS that contains friable ACM, as determined by a CABI, ~~use~~shall be used as a wetting agent, such as a 50:50 mixture of polyoxyethylene ester and polyoxyethylene ether, or the equivalent, in a 0.16 percent solution (1 ounce to 5 gallons) of water, or as per manufacturer recommendations for the wetting of asbestos. This requirement may be waived for emergency situations where the work ~~must~~shall occur immediately and wetting agents are not available.

BMP2 Wind Speed Monitoring for All Mechanical Disturbance and Hand Disturbance of RACS containing friable ACM

- A) ~~Measurement of wind speeds shall be conducted at a minimum of 30 minute intervals and during wind gust(s).~~ Wind measurements shall be taken from within the RWA using a hand held anemometer. Alternatively, or in conjunction with hand held measurements, an onsite weather station may be used within a quarter mile of the RWA as long as the conditions measured by the weather station are representative of conditions in the RWA, or within one quarter mile and representative of the RWA if using an onsite weather station.
 - 1) Measurement of wind speeds shall be conducted at a minimum of 30 minute intervals and during wind gust(s). Average wind speed measurements shall be obtained manually by taking ten readings at one minute intervals and averaging the ten readings, or through the use of instrumentation that provides a ten minute average wind speed reading.
 - 2) ~~Wind break barriers constructed out of materials appropriate to site conditions shall be used.~~
- B) Immediate stoppage of all RACS disturbance shall occur based on the following criteria:

- 1) Wind gust(s) in excess of 20 mph, or
 - 2) sSustained winds in excess of 12 mph, averaged over 10 minutes. ~~based on continuous wind speed measurement, or~~
 - 3) Winds are interfering with the ability of engineering controls to work as intended, or
 - 4) Winds are creating visible emissions that leave the RWA.-
- c) RACS disturbance may resume when all of the following criteria are met:
- 1) Work may resume after nNo gust(s) in excess of 20 mph occur for 20 minutes, and
 - 2) ~~and No~~ sustained winds in excess of 12 mph occur for 20 minutes, based on a 10 minute average ~~of continuous~~ wind speed measurement, ~~and~~ ~~or~~.
 - 3) Winds ~~are not~~ interfering with the ability of engineering controls to function as intended, and
 - 2)4) ~~Winds are not creating visible emissions that leave the RWA. Work may resume once winds are no longer interfering with ability of engineering controls to function as intended.~~

BMP3 Air Monitoring for Mechanical Disturbance in RWAs with in an Adjacent Receptors Zone (to demonstrate effectiveness of BMPs, not for risk evaluation)

- A) For project with durations of 2 days or less, no air monitoring is required. However, the requirements of BMP 1 (adequate wetting) and BMP 4 (no visible emissions leaving the RWA) shall be adhered to on all RACS disturbance projects. Dividing projects into multiple 2 day or shorter components shall not be used as a mechanism to avoid air monitoring requirements.
- B) Area mMonitoring shall consist of a minimum of four samples collected on the perimeter of the RWA at appropriate intervals to provide representative information regarding potential releases of asbestos fibers to the adjacent receptor zone(s). at the four compass points around the perimeter of each distinct area of soil disturbance, with a additional samples collected for large perimeter RWAs work areas (greater than 1 acre). RWAs greater than 1 acre shall require Aa additional perimeter monitoring points shall be added at a rate of one sample for every 200 linear feet (or approximately each additional ¼ acre). If representative information about potential releases to the adjacent receptor zone(s) can be collected using less than the minimum number of samples, the remaining sample locations shall be at the discretion of the AMS.
- C) For mechanical disturbance of RACS containing friable ACM two downwind floating samples shall be collected. The samplers shall be moved based on prevailing wind direction and adjacent receptors. For example, if adjacent receptors are present on only one side of the RWA, one sample location should be maintained between the RWA and the adjacent receptor.
- D) PCM analysis is required on all samples collected (unless all samples will be analyzed by TEM by default). The laboratory shall ould be directed requested to provide verbal results to the AMS or the QPM by the start of the next working day, or

as soon as possible after the start of the next working day, with written results within 24 hours of the receipt of verbal results. [A consultation with CDPHE is required if this timeframe cannot be met by the laboratory.](#)

E) Upon receipt of a laboratory report indicating a "cannot be read (CBR)" analysis result:

- 1) The AMS shall evaluate the lab report and any field documentation to determine a possible cause for the CBR result; and,
- 2) If the CBR cannot be correlated to a specific field event that compromised the sample (e.g. the sample was blown over, the filter of the sample was sprayed with water, etc.) then the sample shall be prepared for indirect TEM analysis to determine potential asbestos content in accordance with Appendix 5B; and,
- 3) If the CBR analysis result can be correlated to a compromised sample, then preparation for indirect TEM analysis is not required,
 - a) Overloading of a sample with particulate matter does not constitute a compromised sample, and will require indirect preparation for TEM analysis; and,
- 4) Field personnel shall evaluate why the sample was compromised and modify field procedures as necessary to prevent future samples being compromised; and,
- 5) The Department shall be notified by phone or email of instances of CBR analysis results within 24 hours of receipt of verbal results.

~~D)~~

~~E)~~ TEM analysis (presence/absence, counts optional) is required as described in 1 through 4 below. The laboratory ~~should~~ [all be requested-be directed](#) to provide verbal results by the start of the next working day, or as soon as possible after the start of the next working day, with written results within 24 hours of the receipt of verbal results.

1) All samples with PCM results having fiber concentrations greater than 0.01 f/cc shall be submitted for TEM analysis.

~~1)2)~~ During the first five (5) days of RACS disturbance – A minimum of 25% of the samples collected from each RWA shall be submitted for TEM analysis. The sample(s) selected for TEM analysis shall ~~be~~ have the highest PCM result(s) based on fiber concentration. If all PCM results are Below Detectable Limit (BDL) for fiber concentration, then the sample(s) selected for TEM analysis shall be determined by highest fiber count. If all samples have no fiber counts [\(i.e. zero fibers counted, not a "below detection limit" fiber concentration\)](#) then no TEM analysis is required.

~~2)3)~~ After five (5) days of RACS disturbance with no asbestos detections by TEM analysis, the frequency of analysis by TEM, on the highest 25% of PCM results(s), ~~can~~ [may](#) be reduced to once every five (5) working days, or portions thereof, using the same selection criteria as in No. 1, above. [The samples submitted for TEM analysis d](#)During the period of reduced frequency TEM analysis [shall be either](#) the first occurrence of: 1) high winds, exceeding wind shut down criteria, or 2) visible emissions; shall result in that day's samples being

submitted for TEM analysis. In the absence of high wind events or visible emissions the selected day for TEM analysis may be random.

~~3)4)~~ If there are any asbestos detections during the random once every five days analysis by TEM, then TEM analysis shall be conducted for [the next](#) three (3) consecutive work days, or portions thereof, using the same procedures as in No. 1, above. If there are no additional asbestos detections during the ~~the~~ [next](#) three (3) consecutive working days with samples submitted for TEM analysis, then the frequency of TEM analysis may return to random once every five (5) working days. [If site conditions, friability of the materials being managed, or work practices change, then the initial 5 days of TEM analysis shall restart using the provisions set forth in BMP 3 \(E\)\(1\).](#)

~~4)5) All samples with PCM results having fiber concentrations greater than 0.01 f/cc shall be submitted for TEM analysis.~~

~~F)G)~~ Detection responses - For each detection of asbestos by TEM analysis, the following shall be conducted:

- 1) Notify [the](#) CDPHE [project manager](#) ~~verbally or~~ by [phone or](#) email, [on the same calendar day within 24 hours of as](#) receipt of verbal or written results (whichever comes first) from lab.
- 2) Evaluate site conditions and engineering controls for each detection, [and immediately implement any identified engineering control revisions necessary to prevent future detections of asbestos fibers.](#)
- 3) Submit an Emission Control Plan (ECP) to the Division for each detection (days with multiple detections can be addressed by a single ECP). The ECP shall be submitted within 48 hours from the asbestos detection event and shall contain:
 - a. The date of the detection.
 - b. A written description of sample details (sample ID, number of structures detected, type of asbestos detected, PCM analytical result) and any potential cause of the release. Include a description of site activity (engineering controls being employed, equipment being used, size of excavation/soil disturbing activity, types of materials encountered, etc.) and CABI observations at the work area before and during the presumed time of release.
 - c. Include a diagram or write up of all air sample positions clearly indicating which sample received the TEM detection. Indicate, through illustration or description, prevailing wind direction and average wind speeds for the detection event; include any wind speed shutdowns for the date of detection. If applicable, indicate through illustration or description downwind floater air sample relocation times and new positions.
 - d. Attach laboratory reports confirming the type and amount of fibers detected by TEM analysis.
 - e. Include any other pertinent information that will additionally describe the release and/or will assist in the prevention of future releases [from the RWA.](#)

- f. Provide a written description of actions taken and any other proposed actions to prevent future releases from the RWA.
- 4) If there are three (3) TEM detections on consecutive analysis events or ten (10) detections for a single project, consultation with CDPHE is required to determine if the BMPs are being implemented appropriately~~best applicable BMPs are being applied~~ and whether;
 - a. Changes in BMPs are likely to prevent future releases; or
 - b. Changes in BMPs are not likely to prevent future releases and a PSRMPSCMP is necessary per Section 5.5.45 (BA) 42; or
 - c. If the owner/operator believes fibers appear to be coming from offsite and are not under the control of the owner/operator; or
 - i. In addition to the information provided in the ECP, documentation ~~must~~shall be provided demonstrating possible additional sources of asbestos fibers.
 - d. Consultation with the Department is required to develop criteria for the evaluation of additional engineering controls for structures within the adjacent receptor zone.
- G)H) Establish protection of adjacent structures or demonstrate that asbestos emissions do not exceed risk-based concentrations. (This is dependent on outcome of Risk)

BMP4 RACS Disturbing Activity Work Practices

A) Minimum work practices requirements applicable to all management disturbance of RACS:

- 1) Prevent~~Ensure that no~~ visible emissions from leaving the RWA by:
 - a. Excavating in lifts not to exceed the extent of wetting; or
 - b. Conducting continuous wetting while mixing dry materials at the point of RACS disturbance to ensure all materials are adequately wet prior to removal from the excavation.
 - c. Instances of visible emissions leaving the RWA work area ~~must~~shall be documented and addressed by changing or increasing controls (e.g. more effective wetting, reduced speed of excavation).
- 2) Stabiliz~~RACS, that will not be kept adequately wet, on exposed excavation faces or soil piles using~~ RACS on exposed excavation faces ~~or soil piles~~ that will be disturbed and/or managed during the project ~~must~~shall either be kept adequately wet (as defined in BMP 1), or be stabilized using any of the following to prevent visible emissions from leaving the RWA:
 - a. Polyethylene sheeting or geotechnical fabric with daily inspection, and inspection after storm events ~~immediately or within 12 hours~~, and repair/replace sheeting as necessary to maintain stabilization; or
 - b. Chemical stabilizer demonstrated to be effective in the stabilization of RACS (e.g. magnesium chloride) with/ weekly inspection, and inspection after storm events ~~immediately or within 1 calendar day~~, and

re-application of chemical stabilizer as necessary to maintain stabilization; or

c. Minimum of 3 inches of soil appropriate for unrestricted use.

- 3) Stormwater should be managed in accordance with the Water Quality Control Commission's stormwater regulations (5 CCR 1002-61), which include specific stormwater permitting and management requirements for construction sites. The Water Quality Control Division should be contacted to determine the specific requirements for each project. Stormwater shall be managed in a manner that minimizes run on and runoff from RACS. Stormwater that comes into contact with RACS shall be treated as asbestos contaminated water in accordance with Section 5.5.7 (E) (4), and areas of non-RACS impacted by asbestos contaminated stormwater shall be managed as RACS in accordance with Section 5.5.7 (E) (35).
- ~~1) Ensure that no visible emissions leave the RWA by:~~
- ~~4) Excavating in lifts not to exceed the extent of wetting; or~~
- ~~5) Conducting continuous wetting while mixing dry materials at the point of RACS disturbance to ensure all materials are adequately wet prior to removal from the excavation.~~
- ~~6) Instances of emissions leaving the work area must be documented and addressed by changing or increasing controls (e.g. more effective wetting, reduced speed of excavation).~~

B) Work Practices Requirements applicable to management/disturbance of RACS using hand methods:

- 1) Hand removal of RACS from the ground surface shall consist of:
 - 1) Wetting and removal of the RACS and 6 inches, in all directions, of surrounding soil or other material from the last occurrence of visible ACM; and,
 - 2) CABI confirmation that the visual extent of ACM and surrounding soil, or other material, has been removed (or extent of excavation has been reached). If RACS remains, it ~~must~~shall be managed for stabilization or future removal. If there is no documented evidence of non-visible RACS at the site, then a visual clearance shall be sufficient to determine the removal of RACS. If there is documented evidence of non-visible RACS at the site, sampling is required to confirm the removal of RACS; and,
- 3) For the purpose of disposal, containerize non-friable asbestos containing materials and associated soil/non-RACS material using a single layer of 6 mil leak tight packaging bag, or containerize friable asbestos containing materials and associated soil/non-RACS material using a double layer of 6 mil leak tight packaging bag. Rigid leak tight containers are also acceptable as packaging for asbestos waste. Dispose of materials properly in accordance with 5.5.2 or 5.5.3 as applicable ~~8~~(A).
- 4) In-situ sub-surface hand removal of a single location RACS pocket shall consist of:

- I. Removal of the pocket of RACS and associated soil or other material, plus removal of an additional 6 inches in the direction of planned disturbance; and
- II. CABI confirmation that the visual extent of RACS and surrounding soil/other material has been removed. If RACS remains, it ~~must~~shall be managed for stabilization or future removal. If there is no documented evidence of non-visible RACS inat the project areasite, then a visual clearance shall be sufficient to determine the removal of RACS. If there is documented evidence of non-visible RACS inat the project areasite, sampling is required to confirm the removal of RACS; and
- III. For the purpose of disposal, containerize non-friable asbestos containing materials and associated soil/~~non-RACS other~~ material using a single 6 mil leak tight bag, or containerize friable asbestos containing materials and associated soil/~~non-RACSother material~~ material using a double 6 mil leak tight bag. Dispose of materials properly in accordance with 5.5.8 (A).

C) Work practices~~Requirements~~ applicable to ~~management disturbance~~ of RACS using mechanical methods:

- 1) Mechanical removal of RACS shall consist of:
 - a) For surface occurrence of RACS - Wetting and removal of all RACS and a minimum of 6 inches of soil, and/or other non-RACS material, in all directions from the last occurrence of visible ACM, with CABI confirmation that the visual extent of RACS has been removed; and/or
 - b) For subsurface occurrence of RACS - Wetting and removal of all RACS and a minimum of three (3) linear feet of soil or other non-RACS material, in the direction(s) of planned excavation, with CABI confirmation that the visual extent of RACS has been removed; and
 - c) If RACS remains in the RWA, it ~~must~~shall be managed for stabilization, per 5.5.7 (F), -or future removal.
 - d) In lieu of stabilization or full removal, sampling may be performed per Appendix 5C to demonstrate that the material is not RACS.
 - ~~e) Packaging and disposal of RACS in accordance with Section 5.5.8.~~

BMP5 Loading and Placement of RACS

- A) Loading procedure for RACS shall consist of:
 - 1) Protection of clean surfaces (including loading surface and truck/or disposal container surfaces that may come in contact with RACS) by covering or decontamination of surfaces prior to ~~demobilization~~transport or removal of truck or disposal container equipment from the ~~RWA~~work area and/or loading zone.
 - 2) Spill prevention shall consist of:
 - a. Minimizing spillage by not overfilling the excavator or loader bucket and returning the bucket to a closed position prior to moving from the loading point; and
 - b. Protective coverings shall be replaced when worn or damaged to prevent breaches; and

c. Controlling runoff to prevent cross contamination from water containing asbestos; and

~~e.d.~~ Spills of RACS shall be mitigated in accordance with 5.5.7 (E).

- 3) During the process of loading the container, the equipment operator should lower the bucket as close as possible to the interior of the container before dumping, and dump the load slowly to allow adequate misting and to prevent emissions.

B) Transportation

- 1) Onsite transportation of RACS between the RWA and an onsite area of disposal or reuse shall comply with the following:

- a) The packaging requirements for RACS set forth in Section 5.5.8 (A) of these Regulations are not applicable; however, the decontamination requirements of 5.5.7 (C) ~~mustshall~~ be followed at the end of disposal operations, or before disposal equipment is ~~permanently~~ removed from the ~~site~~RWA; and
- b) Driving speeds ~~mustshall~~ not exceed 12 miles per hour ~~(equivalent to wind speed shut down criteria)~~ or RACS ~~mustshall~~ be covered during transport; and
- c) For transportation ~~on haul roads~~ between the RWA and a non-contiguous onsite disposal or stockpile area:
 - i. Transportation equipment tires ~~mustshall~~ kept off RACS; or
 - ii. RACS that is driven upon shall be kept adequately wet to prevent visible emissions and The all equipment surfaces that have come into contact with RACS tires mustshall be decontaminated per 5.5.7(C) before leaving the RWA; or
 - iii. The haul road mustshall be managed as RACS for stabilization, per BMP 4A, and future removal of a minimum of 3 inches of soil, or other non-RACS material. If the road is constructed of a durable surface such as concrete or asphalt, the surface ~~mustshall~~ be decontaminated in accordance with 5.5.7 (C)(1)(c) using wet methods, followed by CABI inspection verifying that all soil and debris has been removed from the surface. Rinsate/runoff shall be collected and filtrated to less than 5 microns (or applicable local requirements) and discharged to a sanitary sewer or re-applied to RACS that will be removed.

BMP Matrix Manage Receptor Exposure			Disturbance By Hand Methods ^I		Disturbance By Mechanical Methods
			BMP		BMP
Minimum Requirements for all RACS Disturbance	BMP 1		A, B		A, B
	BMP 2				A, B
	BMP 3				
	BMP 4		A, B, C , D		A, B , C , D , E
	BMP 5		A , B		A , B
Additional Requirements for Disturbance of RACS with Adjacent Receptor(s)	BMP 1				C
	BMP 2				
	BMP 3				A, B, D, E, F , G
	BMP 4				
	BMP 5				
Additional Requirements for Disturbance of RACS Containing Friable ACM	BMP 1				C
	BMP 2		A, B		
	BMP 3				C ^{II}
	BMP 4				
	BMP 5				

^I For the purposes of this BMP Matrix hand removal applies to removal with a shovel or other [non-motorized](#) hand held tools

^{II} Downwind floaters are only required during disturbance of RACS with adjacent receptors
[These requirements are additive moving from top to bottom, but the columns are independent from each other.](#)

These Requirements do not preclude the necessity to comply with any and all other applicable federal, state or local requirements